Department of Development and Environmental Services

Zoning Code: Irrigation System Requirements

19A

A DDES Customer Information Bulletin

King County Department of Development and Environmental Services
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http://www.metrokc.gov/ddes/

Frequently Asked Questions

King County DDES has created customer information bulletins to inform the general public about the effect of codes and regulations on their projects. These bulletins are not intended to be complete statements of all laws and rules and should not be used as substitutes for them. If conflicts and questions arise, current codes and regulations are final authority. Because the codes and regulations may be revised or amended at any time, consult King County staff to be sure you understand all requirements before beginning work. It is the applicant's responsibility to ensure that the project meets all requirements of applicable codes and regulations.

The need for greater efficiency in water use has become urgent in King County as rising populations create an increased demand for water, and drought cycles decrease its availability. The goal for efficiency in private water use for landscaped areas is met largely through water budgeting and efficient irrigation system design.

This bulletin explains water use requirements for irrigation systems in unincorporated King County, as provided in Chapter 21A.16 of the Zoning Code. The use of irrigation systems designed to water private landscaped areas is optional in King County. For specific landscaping requirements, refer to Bulletin 22, *Zoning Code: Landscaping Requirements.*

DDES will play a minor role in reviewing water use calculations and irrigation system design. The applicant must bring DDES a signed affidavit from a professional landscape designer, an architect, or an irrigation consultant, certifying that the calculations and plans meet the requirements described below. To find professional assistance, look in the Yellow Pages of your local telephone book under listings for "landscape architects," "landscape contractors," "landscape designers," and "irrigation consultants."

The following sections specify which type of professional service is needed for the task involved.

Which developments are subject to the irrigation system provisions of the County's Zoning Code?

With the exception of communication facilities, which are regulated by K.C.C. 21A.26, any new development listed in K.C.C. 21A.16.030 is subject to the landscaping provisions. Landscaping provisions include certain restrictions on water to be used for irrigation as well as standards for the use of irrigation systems themselves.

Irrigation systems of any type are optional components of a landscaped area. Owners of new developments who choose to install irrigation systems must prepare a water budget for irrigation purposes, with the following exceptions:

- Individually platted single dwelling residential lots, both for attached and detached dwellings
- Any project with a total landscaped area of less than 500 square feet

Following the date of release of the performance bond, irrigation water use may be monitored yearly by the water purveyor. For further clarification, see Bulletin #22, *Zoning Code: Landscaping Requirements.*

How is an irrigation water budget calculated for landscaping areas?

The water budget (WB) is calculated using the following formula:

$$WB = (Eto) \times (AF) \times (LA) \times (CF)$$

Eto: Referenced Evapotranspiration Rate (net seasonal irrigation requirement in inches–see table below)
AF: Adjustment factor value of 0.8 (i.e., 0.5 x [Eto] / 0.625 irrigation efficiency coefficient)
LA: Landscape area (square feet)
CF: Conversion factor value of 0.62 (Eto inches to gallons per square foot)

	Reference Eto Table - Historical Data												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Net Irrigation Requirement (inches)	0.00	0.00	0.00	0.00	1.59	3.13	4.46	3.51	1.77	0.03	0.00	0.00	14.49

These figures are based on a 30-year average of National Weather Service Data and represent the amount of additional irrigation required for turf grass. Figures are adjusted for the kind of turf typically used in commercial landscaping.

The water budget is calculated based on the total area of the site that is landscaped, including landscaped water features (such as decorative ponds, pools or fountains) that are fed by irrigation water. A "Landscape area" means the entire parcel less the following:

- Sensitive areas and their buffers
- The building footprint
- Driveways
- Paved portions of parking lots
- Hardscapes (e.g., decks, patios, sidewalks, and other nonporous areas)

Owners of recreational areas such as playgrounds or sports fields may apply for additional water use beyond the established water budget (per K.C.C. 21A.16.310).

Potable water must not be used in landscape water features such as decorative ponds, pools, or fountains unless the water feature recirculates the water used in its operation.

Alternative water sources such as recycled wastewater or rainwater are encouraged. Such water sources are not subject to the limits of the water budget.

How is water use calculated?

The following formula is used to calculate the estimated water use (EWU) for each hydrozone (an area where plants require similar amounts of water).

$$EWU = \frac{(Eto) \times (PF) \times (HA) \times (CF)}{IE}$$

Eto, or "Referenced Evapotranspiration Rate," is the net seasonal irrigation requirement in inches (see table in previous section).

PF: Plant factor value (see paragraphs below)
HA: Hydrozone area (square feet)
CF: Conversion factor value of 0.62 (Eto inches to gallons per square foot)
IE: Irrigation efficiency value

The PF (plant factor value) is as follows, unless an adjustment is approved. (For possible adjustments, refer to the discussion below.)

0 to 0.3	for low water use plants
0.4 to 0.6	for average water use plants
0.7 to 1.0	for high water use plants

The higher the amount of water used by a plant, the higher the plant factor. Low water and/or drought-tolerant plant species are encouraged. For further information, refer to Bulletin 22A.

For each hydrozone, plant factor values may be determined and adjusted by a landscape designer (a Washington State registered landscape architect, Washington State certified nurseryman, or Washington State certified landscaper). The adjustment is based on the judgment of the professional landscaper, the materials submitted by the applicant, and the following factors, where relevant:

- Water requirements of the various plant species proposed
- Density of the plantings
- Microclimate of the site
- Soil conditions

What standards pertain to irrigation of landscaped areas?

Irrigation includes any method of applying water to landscaped areas, whether manually, or through installed irrigation systems. Irrigation is optional, but when irrigation systems are used, they must meet the specific requirements outlined in K.C.C. 21A.16.330.

If irrigation is applied manually, it must be done with the goals of avoiding runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, and impervious surfaces. To avoid these situations, the following are recommended:

1. Consider soil type and infiltration rate.
2. Use proper irrigation equipment and schedules, including features such as repeat cycles, to closely match application rates with infiltration rates.
3. Adjust irrigation for special areas such as slopes and median strips.
4. Remember that all irrigation water outlets, except those using alternative water sources, must be downstream of the meter used to measure irrigation water use.

If you decide to use an irrigation system, the following is required, in addition to meeting the provisions of a manual system:

1. Systems must not be located on any turf-grass slopes that exceed a slope of 3 horizontal feet to 1 vertical foot (3:1) or on turf-grass portions of median strip.
2. Systems in landscaped strips that are less than 5 feet wide must be designed to ensure that overspray and/or runoff do not occur. This can be accomplished by using design options such as low volume emitters.
3. System design must be consistent with the requirements of the hydrozone in which the system is located.
4. Systems must be designed with a minimum average irrigation efficiency of 0.625.
5. Automatic shutoff or override capabilities using rain shutoff or moisture sensors are encouraged.
6. Systems must use a master control valve that is connected to an automatic controller.
7. Winterization provisions must be provided through one of the following methods:
   a) Manual drains (automatic drain valves are not permitted)
   b) Some means to blow lines out using pressurized air
8. Separate valves must be used to irrigate plants with different water requirements.
9. A sprinkler head with consistent application rates must be selected for proper area coverage, operating pressure, and adjustment capability.

An Irrigation Association (IA) -certified designer, a registered landscape architect, or a professional engineer with irrigation design experience must certify each irrigation plan system. The irrigation system must also be audited and accepted at installation by an IA-certified irrigation auditor. (See K.C.C. 21A.16.340.)

Irrigation system design plans must be drawn on the same base project map as the landscape plan. The following must be identified on the plans:

- Location and size of any proposed separate water meters for the landscape areas
- Location, type, and size of all components of the irrigation system
- Static water pressure at the point of connection to the water supply source
- Flow rate (gallons per minute), application rates (inches per hour), and design operating pressure (PSI) for each station

Irrigation systems must also be maintained and inspected periodically to ensure proper functioning. If components need to be replaced, the new components must be originally specified parts or materials, or their equivalents.

What requirements pertain to irrigation schedules?

A recommended irrigation program with monthly irrigation schedules is required before and after irrigation system is established. At a minimum, the schedule is based on the average monthly Eto (Evapotranspiration) rate and must include the following:

1. The run time (in minutes per cycle) for each station and cycles per week
2. The amount of applied water in the applicable billing unit used by a purveyor
3. Evapotranspiration data reflecting local microclimates
4. Adjustments for additional water need in recreational areas
5. Additional operating criteria, such as avoiding irrigation at times of high temperatures or winds

Other bulletins and telephone numbers that may be helpful

Bulletin 1	Building and Development Permit Telephone Numbers
Bulletin 8	Commercial and Multi-family Building Permits
Bulletin 9	Obtaining a Residential Building Permit
Bulletin 12	The Residential Building Permit Process
Bulletin 17A	Zoning Code: Overview and Summary
Bulletin 18A	Zoning Code: Permitted Use Tables
Bulletin 21	Sensitive Areas Review
Bulletin 22	Zoning Code: Landscaping Requirements
Bulletin 25	Short Subdivisions
Bulletin 37	Water Problems
Bulletin 40	Financial Guarantees
Bulletin 40A	Financial Guarantees for Residential Permits
Bulletin 40B	Financial Guarantees for Commercial Permits
Bulletin 40C	Financial Guarantees for Grading
Bulletin 40D	Financial Guarantees for Subdivision Approvals

206-296-6600	DDES Information
206-296-6680	DDES Code Enforcement
206-296-1900	King County Department of Natural Resources Drainage Investigation Unit


King County complies with the Americans with Disabilities Act (ADA). If you require an accommodation to attend a meeting (two weeks notice) or require this information in Braille, audiocassette, or large print, please call 206-296-6693 or TDD 206-296-7217.